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OUTCOMES IN LUNG CANCER: WHAT MATTERS

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Abstract

Title: Outcomes in Lung Cancer: What Matters

Lung cancer is one of the most frequent and deadliest type of cancer nowadays. The success of cancer treatment is measured with biomarkers and evaluated by the survival rate. However, according to a patient-centered care, outcomes that are important for lung cancer patients should be considered in the treatment of the disease. Aspects such as health-related quality of life, sleep quality, capacity to perform basic activities, sexual health or fatigue are results in health that matter to the patients, sometimes even more than the overall survival rate. By evaluating which outcomes matter to the patients, medicine becomes more aligned to each patients' desires.

Keywords: Value-Based Health Care, Lung Cancer, Outcomes, Patient-Reported Outcomes, Patient-Centered Care

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1. INTRODUCTION

Lung Cancer

Lung cancer remains the leading cause of cancer-related deaths for men and women globally (American Lung Association 2020). In incidence, lung cancer ranks second, surpassed by breast cancer in women and prostate cancer in men (Barta, Powell, and Wisnivesky 2019). Sex and gender differences have implications on screening, response to therapy and prognosis (Mederos et al. 2020). Lung cancer is one of the most frequent and most deadly cancer types. According to the WHO, in 2020 lung cancer was the second most frequently diagnosed cancer type (11.4% of all cases) with 2.207.000 new patients. With 1.8 million tumour-related deaths annually world-wide, lung cancer causes more deaths than breast, colorectal, and prostate cancers combined (Sung et al. 2021). Besides the high mortality associated with lung cancer, there is also a high burden of disease for patients with lung cancer with lots of symptoms caused by the disease or by its treatment, with a huge impact on the quality of life for these patients.

This disease characterizes by the abnormal and uncontrolled grow of lung cells leading to a nodule or tumour. There is essentially two main types of lung cancer – classified in accordance to how the cells look under a microscope – which is non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). SCLC is generally characterized by a quick and aggressive growth with a 10-15% of incidence (NIH, 2021) while NSCLC is the most common type (80-90%) and growth is usually slower (D'Addario et al. 2010).

There are three subtypes of non-small cell lung cancer: adenocarcinoma, squamous cell carcinoma and large cell carcinoma, cited from most common to less common. Smoking is the major risk factor for non-small cell lung cancer. The earlier in life a person starts smoking, the more often a person smokes, and the more years a person smokes, the greater the risk of lung cancer (NIH, 2021).

After diagnosis, different types of treatments are available for patients with NSCLC. Some treatments are standard (the currently used treatment) and some are being tested in clinical trials. For standard treatment, nine options are available: surgery, radiation therapy, chemotherapy, targeted therapy, immunotherapy, laser therapy, photodynamic therapy, cryosurgery and electrocautery (Postmus et al. 2017).

Some researchers have seen that in people with risk factors for lung cancer by doing a low-dose tomographic screening annually, small nodules can be detected and lung cancer mortality can be reduced (Duffy and Field 2020).

Patient-Centered Care

When thinking in value – from value-based healthcare – we have to have the patient in the centre. A current barrier to the adoption of value-based healthcare is the absence of standardised outcomes that are meaningful to patients. Each cancer is different because it relates to the individuality of the person who has that diagnosis. It is important to know the disease but it is even more important to know the person who has the disease. A person with lung cancer is still a person with desires, goals and feelings. A patient is not a diagnosis. A patient is a person with a diagnosis.

Strategies for outcome measurement are needed and comprehensive indicators of which results matter to the patient should be well established. However, until now, interest in measuring quality of care has been relatively low.

At present, the most effective approach for measuring quality of care remains an open issue. Most current metrics from the National Quality Forum and other entities have focused on so-called process measures (e.g., the quantity of lymph nodes sampled and therefore the timely delivery of adjuvant therapy), instead of patient outcomes like survival, quality of life, and functional status. Efforts to define outcomes that matter to patients have been accelerated

by the International Consortium for Health Outcomes Measurement (ICHOM) for a variety of conditions, including lung cancer. The goal of outcome measurement is to support clinical practice and these indicators include survival, quality of life markers (measured mainly using patient-reported outcomes), and quality of death measures (Eaton, Jagels, and Martins 2016).

The National Comprehensive Cancer Network (NCCN) assembles expert panels to develop guidelines for treating many cancers based on available evidence and expert opinion. The NCCN guidelines, however, offer many choices for a given clinical scenario and, without clear efficacy differences, offer minimal guidance regarding which choice to choose. Clinical pathways are developed by variety of organizations (e.g., providers, insurers) to assist clinicians choose among the various therapeutic options in a very given clinical situation. Clinical pathways have the potential to cut back unnecessary variation in care delivery, which may be a driver of excess costs. It is understood that pathway-directed care is not appropriate for all patients at any times. Clinical judgment should dictate that a subset of patients must not be treated on pathway due to comorbidities, unusual clinical presentations, and other factors (NCCN 2021).

Treatments x Quality of Life

As with many other patients affected with solid tumors, the quality of life (QoL) of lung cancer patients is affected by several factors related to the patient, disease and treatment characteristics. Such aspects are correlated with the type and stage of disease affecting treatment strategy and different treatment strategies (e.g., surgery, radiotherapy, chemotherapy) determining patient acceptance and side effects (Gridelli et al. 2001).

For small-cell lung cancer, the most widely accepted strategy is aggressive, primarily based on chemotherapy and combined with radiotherapy for a limited disease (Rudin et al. 2021). On the other hand, the treatment strategy for non-small-cell lung

cancer is strongly dependent on the stage of the disease, surgery being the first choice for early stages, a combination of chemo and radiotherapy for locally advanced disease, and chemotherapy alone being presently the best therapeutic option for metastatic patients. Surgical resection, indicated in early stage NSCLC, implies a careful selection of patients based on the presence of comorbidity, general health status and functional respiratory assessment. When feasible, the extension of resection may significantly impair patient QoL, for example, in the case of pneumectomy. Combined chemo-radiotherapy, employed for treatment of limited SCLC and locally advanced NSCLC, may produce significant toxicity, both acute (e.g., esophagitis, myelosuppression) and late (e.g., fibrosis), particularly when concurrent schedules are used. In addition, the logistics of concurrent, combined treatments are usually more complicated than single or sequential treatment strategies. Chemotherapy alone, employed for treatment of metastatic NSCLC and extensive SCLC, is frequently characterized by relevant toxicity, particularly when cisplatin is used or when combinations of several agents are applied. It must be acknowledged that, from the standpoint of toxicity, chemotherapy is usually viewed negatively by patients and relatives. (Stevenson 2021)

Lung Cancer: Prospect Perspectives

The worldwide lung cancer epidemic is still broadly present. Years of focus on prevention and intervention for tobacco consumption decreasing until now has only had a modest effect on the incidence of lung cancer. Attempts over many years to develop more effective treatment methods have only slightly changed the prognosis of this deadly disease. Aiming on the development of new treatment options and implementation of screening for lung cancer, a new optimism can be traced in the professional environment (Dela Cruz et al. 2011).

Data supports that lung cancer is being diagnosed at an earlier stage, incidence will stop increasing, and mortality will decrease further. But these positive changes have consequences in terms of substantially increasing prevalence, with resources distributed to an increased demand for treatment, follow-up, and aftercare. Projections of cancer incidence, mortality and prevalence are important for planning health services and to provide a baseline for assessing the impact of public health interventions (Jakobsen et al. 2021).

Research Question

As we have seen before lung cancer incidence is growing globally, being one of the most frequent and deadliest types of cancer nowadays. The success of cancer treatment is usually measured with biomarkers and with the only purpose to increase survival rate. Clinicians suppose that is what patients want even if that means a significant decrease in their quality of life. However, it is important to understand what patients value and find most important during the course of their illness so clinicians can develop new best practices that can lead to those best results in the patients' view. Our research question falls in understanding which dimensions are important for patients and which results in health are prised for them – patient centered care – so we aim to find which outcomes matter to lung cancer patients.

2. LITERATURE REVIEW

Researchers have seen that implementation of value based healthcare is feasible and beneficial in daily clinical care for lung cancer patients resulting in less emergency department visits, shorter length of stay on the oncology day clinic and better survival. These improved outcomes are not only relevant for the patients themselves, but also for the hospital organization (optimal use of day clinic) and health care system (less ED visits, an important driver of costs) (Demedts et al. 2021)

Patient-Reported Outcomes

In 2010, the Harvard Business School economist Michael E. Porter wrote:

"Value should always be defined around the customer, and in a well-functioning health care system, the creation of value for patients should determine the rewards for all other actors in the system. Since value depends on results, not inputs, value in health care is measured by the out- comes achieved, not the volume of services delivered, and shifting focus from volume to value is a central challenge."

Although Patient-Reported Outcomes (PROs) are a concept discussed previously, their use has significantly changed (Baumhauer and Bozic 2016). Outcome instruments were used for research and the result was either found successful or not at the conclusion of a treatment. Nowadays, we aim to be able to collect PROs in real time, in a large variety of domains such as physical function, pain, depression, anxiety and fatigue. For instance, surgeons are not able to assess mental health, however, for improvement of patient care we need to be capable of analyze those multi-disciplinary scopes. PROMs should be discussed with the patient during their office visit, compared to normative values for similar conditions to use this data to build

clinical decision making consistent with the patient's preferences, values, and severity of disease (Baumhauer and Bozic 2016).

2.1. Outcomes in Lung Cancer – State of the Art

Health-Related Quality of Life | Survival

Health-Related Quality of Life (HRQoL) is difficult to define (Polanski et al. 2016). The majority of researchers refer to the definition given by the WHO where HRQoL denotes complex self-assessment including physical health, psychological state, level of independence and dependency on others, social relationships, and religion and personal beliefs. Generally assessment of health condition, a very important role is played by mental and social resources that patients possess before the onset of the disease and also the environmental response to a change within the condition of their health. The foremost important factors include material resources, education, intellectual resources, marital status, level of social support, and availability and quality of medical services. The WHO recognized the following indicators of QoL: ability to play and modify social roles in life, adaptation, and mental well-being. The factors that influence the QoL negatively include negative health behaviours, exposure to stressful situations, and methods to beat them

Clear measurement of outcomes and costs has the potential to align patients, providers and payers towards a joint goal of improving the value of care for lung cancer patients. The International Consortium for Health Outcomes Measurement (ICHOM) Standard Set for Lung Cancer – Appendix I – includes five dimensions: quality of death (duration of time spent in hospital at end of life and place of death); survival (overall survival and cause-specific survival); degree of health (health-related QoL, fatigue and vitality, pain, cough, shortness of breath and performance status); acute complications of treatment and time from diagnosis to treatment.

Apart from ICHOM, there are four more instruments currently in use for assessment of PROMs in lung cancer patients (Bouazza et al. 2017). Firstly, the "European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30)" which was launched in 1986 stays as a 30-item cancer-specific questionnaire for measuring global health and overall Quality of Life (QoL) scales, five functioning domains (physical, role, cognitive, emotional, and social), three symptom scales (fatigue, pain, and nausea and vomiting), and six single items that assess additional symptoms commonly reported by cancer patients (dyspnoeal, appetite loss, sleep disturbance, constipation, and diarrhea) together with any perceived financial difficulties. The QLQ-LC13 – Appendix II – incorporates one multi-item scale (dyspnoea) and nine single items (pain located the arm/shoulder, chest, and other organs; cough; haemoptysis; dysphagia; peripheral neuropathy; alopecia; mouth sores). In both surveys, high scores represent better functioning and severe symptoms (EORTC 2021). The EORTC includes a separate questionnaire assessing the HRQOL of patients within the palliative care setting (QLQ-C15-PAL).

Secondly, *the "Functional Assessment of Cancer Therapy-Lung Cancer (FACT-L)" is a combination of a generic cancer scale and additional lung cancer symptoms: dyspnoea, ease of breathing, cough, tightness in chest, appetite, weight loss, hair loss, cognitive function and regret about smoking (nine items). FACT-L has been used extensively in clinical research as a key patient-reported outcome. After the EORTC QLQ-LC13, it is the foremost preferred instrument in clinical research for the evaluation of the HRQOL in the lung cancer population* (Bouazza et al. 2017).

Thirdly, the "Lung Cancer Symptom Scale (LCSS)" was developed in 1985 and evaluates six major symptoms related to lung hostilities and their effects on overall symptomatic distress, functional activities, and global QoL (Eser et al. 2016). The LCSS has no general cancer component and consists of nine items of which six symptoms (appetite,

fatigue, cough, dyspnoea, haemoptysis and pain; one item each), overall symptom distress (one item), the activity level (one item) and the global QoL related with lung cancer (one item). Additionally, there is also a six-item scale for the observer (caregiver) to report, which questions the equivalent symptoms. To enhance the utilization of this sort of questionnaires, some researches have studied the utilization of the electronic Lung Cancer Symptom Scale (ELCSS-QL) and have stated that is feasible as a tool to be used in routine clinical practice and is a vital component of care for patients with lung cancer (Kuo et al. 2020).

Finally, *the MD Anderson Symptom Inventory (MDASI) was developed in 2000 to assess the severity of cancer symptoms or its treatment. The MDASI contains thirteen items that question the symptoms experienced most often by all form of cancer patients: pain, fatigue, nausea, vomiting, dry mouth, shortness of breath, lack of appetite, difficulty remembering, drowsiness, disturbed sleep, sadness, distress, numbness/tingling. Additionally, it includes six interference items: general activity, mood, walking ability, normal work, relations with others, and pleasure in life. The MD Anderson Symptom Inventory Lung Cancer Module (MDASI-LC), developed in 2011, is the lung cancer-specific module and is additionally utilized in combination with the core module. The lung cancer-specific items were selected after a literature review and clinician input. It includes the core items with the subsequent three items: coughing, constipation, and sore throat* (Bouazza et al. 2017).

In lung cancer patients, HRQoL affects the survival and for this reason understanding factors which will influence components of quality of life are crucial for disease management. Cancer is a systemic disease and therefore the body's psychological state, nervous, immune and endocrine systems have an important impact on the occurrence, development and prognosis of cancer. The assessment of QoL has already been suggested to be incorporated into routine oncology clinical practice in various studies like Yun et al. 2016.

Poor quality of life is taken into consideration as a prognostic factor for shorter survival in lung cancer patients. Patients diagnosed with cancer are at an increased risk for several common mental disorders like depression that is also related to poor survival of cancer patients. Past studies showed that a relationship does exist between depression and patient prognosis, because the survival of depressed patients was significantly lower. Wu et al. 2016 showed that depression significantly reduces patient tolerance to chemotherapy. For instance, depression significantly increases chemotherapy-induced vomiting and leukopenia and results in chemotherapy resistant in these patients. This phenomenon reduces the likelihood that patients will follow the recommendation of their physicians, which might lessen the effects of chemotherapy.

Some studies have drawn attention to the fact that the decrease in physical functioning and increase in symptom severity in patients with lung cancer affect overall quality of life and translate into worse prognosis. Advanced lung cancer symptoms like symptomatic breathing difficulty, coughing, shortness of breath, tightness in the chest and sleep disturbance is closely associated with a poor quality of life. A study from Lou et al. 2017 showed that patients with severe respiratory symptoms were more likely to be poor sleepers and to possess a lower quality of life. Respiratory symptoms and sleep disturbance are significant indicators of quality of life. Additionally, sleep disturbance may mediate the link between respiratory symptoms and quality of life.

Also, according to Wang, Hao, and Zhang 2017, significant factors associated with poor quality of life in lung cancer patients are gender (male), younger age, surgical history, unstable employment status and medical insurance. These factors predicted the severity of unhealthy psychology. Patients with depression symptoms suffer across all health domains; however, only more lung cancer symptoms or less social support are related to worse mortality among these people (Sullivan et al. 2016).

In conclusion, the acceptance of illness is one of the significant factors affecting the extent of quality of life in patients with chronic diseases. The acceptance of illness and perception of pain determine quality of life which is a recognized predictor of survival. Understanding the role of acceptance of illness and perception of pain among lung cancer patients helps to enhance care procedure in this group of patients (Chabowski et al. 2017).

Fatigue and Vitality

Cancer-related fatigue is the commonest and most debilitating symptom in patients with cancers, including lung cancer. Within the entire course of lung cancer, from diagnosis until the end of life, fatigue is present in the majority of patients, which incorporates a huge influence on QoL. The incidence of fatigue can change varying on the time of the disease in which it is evaluated and on the existence of comorbidity, cluster symptoms, and treatments, which may improve or worsen the case. Fatigue is primary when associated with the tumour, while it is defined as secondary if it is due to treatment, nutritional status, laboratory abnormalities, use/abuse of substance, and/or comorbidities. A close connexion exists between pain and fatigue and among breathing symptoms and fatigue. Management of fatigue and its cluster symptoms becomes essential for the QoL care of patients with lung cancer at any stage of the disease. Up to now, no standard treatment is suggested to deal with fatigue. Sleeping and antidepressant agents are often prescribed with none evidence supporting their use in this context (Carnio, Di Stefano, and Novello 2016).

WHO Performance Status

Performance status is a strong independent predictor of survival in lung cancer and it is recommended to quantify performance status according to the Eastern Cooperative Oncology Group (ECOG) and WHO scoring method, starting from zero to five and provides clinician-reported to correlate with patient-reported outcomes (Mak et al. 2016).

Other

Other outcomes were described in Mclouth et al. 2021 like dermatologic problems, arthralgia, myalgia, and financial concerns. Also, time to metastasis is brought out in the article of Ryan et al. 2019.

3. METHODOLOGY

Methods

This paper aims to find specific outcomes that are important to health care professionals and lung cancer patients using a qualitative methodology. Firstly, it was done a research in PubMed for English language articles published in the last five years – from 2016 to 2021 – in which we got a total of 274 papers (Appendix III). All titles and abstracts were read and about two thirds of them were excluded, which got me 71 papers that were analysed and those that were pertinent for this WP were cited. Afterwards, we proceeded to interviews in order to compare what we extracted from literature to what health care professionals and patients mentioned.

Study Sample

Interviews were realized during the months of October and November of 2021 and englobed a group of thirteen individuals of Portuguese nationality. The sample consisted of seven medical doctors (one specialized in palliative care, one oncologist and five pneumologists), three nurses and three administrators of lung cancer patient organizations (in which two of them are also lung cancer patients). The participants for this study were recruited from the joint project "Lung Cancer 360".

Research Design

The participants were asked to take part in individual interviews that lasted for about half an hour. A previously created interview guide - Appendix IV - was used during the process to give directions yet allow the interviewee to communicate freely. Our task was to adapt the questions to what was said and/or to modify them accordingly. All interviews were conducted online via the video conference platform "Zoom". To facilitate data collection afterwards, each interview was recorded after the participants had given their consent.

4. FINDINGS

"*The first thing that patients want is to not have cancer*." – Doctor

Not everything that is present in the literature matches what is important on the ground in practical terms: to patients and to clinicians, so it is important to interview these people to find what is relevant on the ground. Some of the outcomes that were extracted from the literature were mentioned during the interviews but some others were highlighted and came as new insights – Appendix V.

4.1. Newly Identified Outcomes

Sexual Health

Sexual health comes out when we think of outcomes based on the patients' needs. Sexual health is one of the basis of the human integrity. Although sexual health is still a tabu topic when we think about life threatened diseases, it still remains a human basic need. It is important to be brought out from the beginning of the disease as it relates to emotional and psychological health.

"When we have a cancer diagnosis, some basic needs are put in second place but they are still primary human needs." – Nurse

According to Virginia Henderson, humans have fourteen basic needs (Ahtisham and Jacoline 2015) that should be fulfilled and to strength this idea, we know that cancer is a long-lasting disease so these aspects should be brought out from the beginning, developed and discussed.

Mental Health

Mental health may be one of the most important outcomes in the perspective of clinicians and patients. As we have seen before, a diagnosis of depression is a negative correlator of

effectiveness in cancer treatment and overall survival. The way the patient faces the disease and is able to maintain a healthy psychological status is critical for a positive cancer path.

During interviews, related to mental health some other feedback was given. Besides the anxiety brought out from the financial concerns patients might have, there is also loneliness because social life is affected if the emotional health is not maintained. Also, life after cancer is left behind while the patient is in treatment and he/she might feel in a frustrated and empty situation once the illness is cured:

"While the person has cancer everything is focused on the cancer and the person, but then how is it? Are there consequences for life? Is the person prepared for it? How is he/she going to keep up afterwards?" – Patient

These questions brought out from a former lung cancer patient should make us reflect that there are no implemented strategies for life after cancer. For example, employment, therapy, fears, social life, psychological traumas, etc, should be addressed so that the person can be prepare to retake his/her life before cancer and be fully integrated in the society has a person who no longer has a cancer diagnosis.

Sleep Quality

Sleep quality may be connected to mental health – as we have seen in the literature review – since sleep disturbance is associated to a poorer emotional status. Having trouble sleeping, especially because of the symptomology of lung cancer, affects the patients' quality of life, mental health and even fatigue. It is crucial that the patient can sleep and recover. This outcome is brought out as being one of the most important according to the patients' feedback in interviews.

Quality of Death

If the communication with the palliative care unit is honest, the patient will be confident to share if it is him or her desire to die at home or in the hospital. Palliative care can provide a control of symptoms although that is not all. Expectations should be measured not only with the patient but also with the family. Are there conditions? Is that a desire of the family? Lung cancer death is bound to suffer, dyspnoea, lack of breath and may be associated to huge suffering to the patient. That is passive of causing trauma to family members and despair in the moment of death.

Communication is key in this decision and, of course, to understand what is important for this group of people. The patient and the family should have access to all information, risks and possibilities because for the communication to be effective and secure, the individuals have to be informed, clarified and capable to choose according to what they know. Even if it is the patient desire to die at home, the professional has to understand if that is also the desire of the family. It is key to make a bridge between the patients' will, the family's option and the conditions required. If not, to die in the hospital should be considered as the only option.

Also, that decision is validated in the moment that is taken. If some time goes by that decision should be validated again because circumstances change and the will of the patient may change according to his (worsen) health state. The decision should meet what gives the patient security. Having respect for the person's autonomy is not meeting the individual's absolute will. The desire should follow a relational autonomy, that is, in collaboration to what is the desire of the different elements that compound the individual context. To die with dignity is an important outcome from the patients' point of view. To die feeling reconciliated, as Paul Ricoeur once said: "living up to death" (Joy 2011).

Well-Being of Caregivers

If we look to the outcomes that are important for lung cancer patients in a 360º perspective, we come to the conclusion that the well-being of caregivers is significant.

"The caregiver is the mirror of the way the patient feels" – Patient

A study from Kim et al. 2016 has shown that psychological distress levels were highest for patients (3.8/10) and Family Caregivers (FCGs) (5.1/10) before surgery. Also, that distress levels decreased among patients later, but remained elevated among FCGs.

Globally, FCGs of lung cancer patients experience significant psychological distress. The trajectory of QoL for FCGs does not mirror that of patients. The palliative care intervention shows improvement in QoL outcomes for patients but is not effective for their FCGs.

"To have quality of life, besides of the physical question is (...) to find strength, peace, acceptance of the illness and at the same time have someone next to us that also accepts, gives us strength, who has strength, an interior peace."

– Patient Organization Representative (not-patient)

Capacity to Perform Basic Activities

Basic daily activities are the basic needs of every human being and lung cancer patients have mostly affected activity capabilities such as walk, take stairs, take a bath or even being talk because of the shortness of breath. It is crucial that we identify the basic needs of the lung cancer patient in the different stages. There are different commitments of activities according to the stage of the disease. It all sums up to the patient being able to continue its daily activities, besides the disease.

"When patients have control of symptoms and capacities to take live their lives normally they almost forget about the disease." – Nurse

The management of energy and strength is crucial for a patient with a respiratory disease. The greatest values can be strength, energy and knowledge. Strength definitely includes physical strength but also aminic, spiritual and religious strength. All those strands should be worked on.

5. DISCUSSION

During interviews I found that there is a bit of misconception between what are outcomes, risk adjustment variables and the process to reach the best results.

5.1. Risk Adjustment Variables

There are vulnerability factors that can be present in an individuals' life in various ways. For example, the loss of a family member, a divorce, socio-economic difficulties, unemployment, access to healthcare, etc, and can happen close in time to the cancer diagnosis and will change the way the person's receive that information and proceeds in further steps.

"There are factors that affect the results of multi-variety nature: physicals, for example the patient having comorbidities which can impede the best treatment; psychological, for example individuals that do not want to do a treatment or conditionate at the beginning which treatment they want to do – "I don't want to do chemotherapy" or "For surgery I won't go"; family factors; economic factors from the hospital budget or insurance companies and geographic because the health resources are not the same for everyone." – Doctor

<u>Literacy</u>

It is harder to treat a person to whom the doctor cannot communicate than with someone with a deeper knowledge of the subject. Illiteracy is sometimes the cause of the not right following of the treatment and medicines; of the poor communication between doctor and patient or of missing appointments which correlated negatively with a positive survival.

Access to Health Care System

Access to healthcare is still an issue in Portugal because the resources are not the same in the coast or interior of the country. Patients that have socioeconomic limitations may not be able to go to the appointments or follow properly the treatment.

5.2. Process to Reach the Best Results

Communication Doctor-Patient

Communication is crucial. When developing a therapeutic treatment, that should not be done to the patient but with the patient. Outcomes based in value have people in the centre and we should validate our decision with that individual to understand that the intervention is adjusted to what the patient believes it is important.

"*I think it is very important when the person has a cancer to feel that the speech of the clinics are speeches for the patient to understand (…) because clinicians sometimes apply terms in which the literacy is not the same for the patient to understand (…) the most important thing is to have a basic speech, that is not too accurate, but makes the person on the other side to understand."* – Patient

The approach should be integrated. Patient needs, the clinical context, the security, the communication, the family environment. The doctor should be sure that the patient understands what is being said and has a clear sight of what is happening.

Time from Diagnosis to Treatment

Time from diagnosis to the beginning of the treatment is crucial in a disease like lung cancer because mortality is directly correlated with the disease stage. Although there is not preventive exams for lung cancer, people should be aware of the symptoms and act quickly once something

is wrong. This is also related to health literacy. After the diagnosis, the best way to have the best results is to start the treatment as soon as possible.

Palliative Care

Palliative care requires firstly a clear understanding of the concept from the patient. To improve cancer healthcare, palliative care should be integrated from the beginning because this specialty has a broaden view of the situation. Although this kind of care is most important in an advanced stage of the disease, it should be present from the beginning because it is crucial to have a clear understanding of the patient, the family, the circumstances, desires and expectations which is decisive in the final stage of the patient life. In contrast with – for example – having access to palliative care just a few weeks before dying, accomplish those desires will not be the priority.

"Palliative care has a human side really accentuated, of an integrated view of the patients' approach. They have a really specific care in not just talk with the patient – prepare him/her to what is coming – but also talk to the family and stipulate a plan." – Doctor

Palliative care should be integrated in the patients' journey as soon as possible so they can have a life ending in a serene and peaceful mode. There are limitations in palliative care though. In Portugal, for instances, the access is limited. Only 20% of people who need this type of care have access to it (Atlas da Saúde 2021) which brings a huge problem to the national healthcare systems.

"As soon as the lung cancer patient is diagnosed should be referenced to the palliative care unit by the doctor so that the time in the waiting list does not so much impact." – Nurse

The communication is the basis. It is hard for the doctor to talk about palliative care to the patient because it comes as a message of last steps while finding ways to give hope to battle the disease to the patient. That is why the communication of the clear concept of palliative care

is crucial so that the patient understands that questions such as “what do we have?”, “what can we do?” and “where are we going?” in an open conversation in early phases and is decisive.

Multidisciplinary Team

Cancer requires a complex answer and complex answers require a multidisciplinary team. Furthermore, there is evidence suggesting that the multidisciplinary model of care contributes to improvements in lung cancer outcomes. Multidisciplinary care is the cornerstone of lung cancer treatment in the developed world, despite a relative lack of evidence that this model of care improves outcomes. Health service research suggests that multidisciplinary care improves care coordination, leading to a better patient knowledge, and reduces variation in care, a problem in lung cancer management that has been identified worldwide. The multidisciplinary model of care overcomes barriers to treatment, promotes standardized treatment through adherence to guidelines, and allows audit of clinical services and for these reasons is more likely to provide quality care for lung cancer patients (Denton and Conron 2016). Cancer should be treated in a global way since the patients’ suffering is not only physical but total.

These findings were confirmed and brought out from the clinicians interviewed. The team that was suggested to accompany the patient are various doctors – pneumologist and/or oncologist, physiatry, palliative care and all other specialities that are involved in the patient’s comorbidities and treatment – nurse, psychologist, nutritionist, social assistant and chaplain.

5.3. Limitations

EORTC Questionnaire

Value-based healthcare focuses on patient centred outcomes, by incorporating Patient Reported Outcome Measures. From the interviews feedback we understood that the EORTC questionnaire that assesses lung cancer patients’ quality of life is not useful nor used in

appointments. The main reason given by the clinicians was lack of time, illiteracy in patients and globally doctors do not find it useful.

"People work like machines. They have 10 minutes to see a patient and those questionnaires and approaches require time. That should be done with time and in order to help the patient or is not worth it." – Nurse

"They have several limitations: a lot of times the complexity of the questionnaires, but most important than that is the time limitation of health professionals. (…) If I felt that (those questionnaires) were useful, of course it would be applied." – Doctor

Some clinicals suggested that the questionnaire should be completed before the appointment however not all patients would be able to do it (due to illiteracy) so this tool is mentioned as being useless. One alternative to such instrument is making it digital.

Work Project

The limitation of this work is that only thirteens interviews were realized. Despite recognizing repetitive responses in various categories, it is surprising that we have not met some outcomes that are present in the literature in interviews so we can conclude that we have not reached the point of saturation which can only be achieved by a larger amount of data.

5.4. Next Steps

There are several key topics to be addressed in the future, according to our investigation. The implementation of a multidisplinary team from the moment of diagnosis is crucial for the health and well-being of the patient, especially for the mental state; improved measures are needed for assessing the quality of death and dying since it still is a controversial topic; palliative care should accompany the patient from the beginning and, finally, the development of new PROMs that improve precision, increase utility in practical terms and guide subsequent adoption.

6. CONCLUSION

Medicine aims to cure (lung cancer, in this case) and the doctors' effort is mainly focused on the survival rate, leaving in the vast majority of cases a wide range of consequences and secondary effects in their patients. Should we aim to only cure and leave beside quality of life aspects? Is it wise to make people live a few more months at any cost? When we think about cancer, one way to measure success is thinking about survival rates however success results should bear in mind what is important for the patient, how has that result affected the patients' life, that we can compare to a quote once said by Abel Salazar:

"*A doctor that only knows about Medicine, doesn't even know about Medicine.*"

Because we should not just aim for the clinical reasoning, a patient has wills, desires and fears and should be focused in an holistic way, always having in mind that is a person.

When we consider about the possibility of thinking in alternative ways of treatment to meet the expectations of the patient and what is important for this group of people, we find new solutions – that can be clinical, organizational or technological – that will improve this people's life while they are alive and aware of their surroundings.

In summary, knowing which treatment a patient must do and how to battle the disease is, of course, really important, but Medicine nowadays should also be able to englobe other aspects of the patients' existence such as quality of life, mental health, expectations and desires. We hope that in the future the treatment of cancer has a more wide and multidisciplinary team involved, quality of life parameters are taken in consideration and mental health has a principal role, as it should be. This work project and the list of outcomes extracted from the investigation are a small light in hope for further explorations. It is a starting point, and time and experience will be needed to refine the set towards a true global standard.

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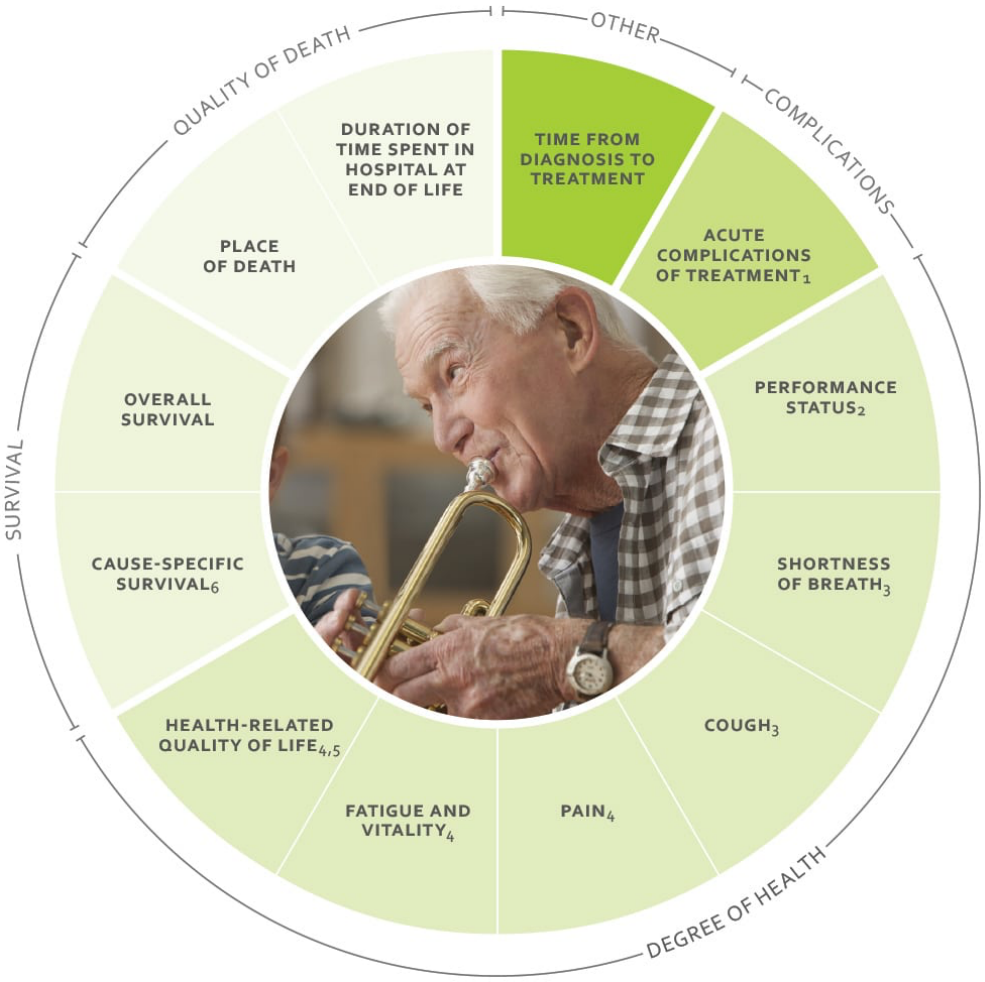
Appendix

Appendix I



Source: Outcomes according to the International Consortium for Health Outcomes Measurement (ICHOM) for Lung Cancer | Retrieved on November 2021

Appendix II

EORTC QLQ - LC13

Patients sometimes report that they have the following symptoms or problems. Please indicate the extent to which you have experienced these symptoms or problems during the past week. Please answer by circling the number that best applies to you.

During the past week :		**Not at All**	**A Little**	**Quite a Bit**	**Very Much**
31.	How much did you cough?	1	2	3	4
32.	Did you cough up blood?	1	2	3	4
33.	Were you short of breath when you rested?	1	2	3	4
34.	Were you short of breath when you walked?	1	2	3	4
35.	Were you short of breath when you climbed stairs?	1	2	3	4
36.	Have you had a sore mouth or tongue?	1	2	3	4
37.	Have you had trouble swallowing?	1	2	3	4
38.	Have you had tingling hands or feet?	1	2	3	4
39.	Have you had hair loss?	1	2	3	4
40.	Have you had pain in your chest?	1	2	3	4
41.	Have you had pain in your arm or shoulder?	1	2	3	4
42.	Have you had pain in other parts of your body?	1	2	3	4
	If yes, where _____				
43.	Did you take any medicine for pain?				
	1 No 2 Yes				
	If yes, how much did it help?	1	2	3	4

Source: QLQ-C30-LC13 EORTC Quality of life Group | Retrieved on November 2021

Appendix III

Query	Results
Search: **(Lung Cancer[title]) AND ("Quality of Life"[Mesh] OR "Quality Indicators, Health Care"[Mesh] OR "Patient Outcome Assessment"[Mesh] OR "Treatment Outcome"[Mesh] OR Quality of life[tiab] OR QOL[tiab] OR Quality indicator*[tiab] OR Patient reported outcome*[tiab] OR Patient related outcome*[tiab] OR Patient outcome*[tiab] OR Patient assessment*[tiab] OR Treatment outcome*[tiab] OR Outcome*[ti]) AND (Index[tiab] Indices[tiab] OR Instrument*[tiab] OR measure*[tiab] OR questionnaire*[tiab] OR profile*[tiab] OR scale*[tiab] OR scor*[tiab] OR status[tiab] OR survey*[tiab] OR rating*[tiab] OR tool*[tiab] OR metric*[tiab] OR reporting[tiab])** Filters: **Free full text, Full text, Randomized Controlled Trial, Review, Systematic Review, Humans, English, from 2016 - 2021**	274

Source: PubMed | Retrieved on September 2021

Appendix IV

Interview Guide

1. Please introduce yourself. What has been your reality with lung cancer? In which way is it present in your life?
2. If you had to develop a core outcome set for lung cancer by yourself, without going into any literature review, which dimensions would you include? What comes first to your mind as most important outcomes in lung cancer?
3. (If practitioner) As someone who deals with lung cancer patients, which information would you like to have access?
4. (If researcher) Do you have any suggestion of how these dimensions could be measured? Which scales could we use, if you know any?
5. Besides the disease gravity, is it equally challenging treat every person with lung cancer? Is there any group of patients that is harder to treat? What can affect results in patients?

Source: Own elaboration

Appendix V

Previously Identified Outcomes	Newly Identified Outcomes
- (*) Health related quality of life | Survival - Fatigue and vitality - WHO Performance status - Other: dermatologic problems, arthralgia, myalgia, (*) financial concerns and (*) time to metastasis	- Sexual health - Mental health - Sleep quality - Quality of death - Well-being of caregivers - Capacity to perform basic activities

(*) Outcome mentioned in interviews

Source: Own elaboration